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Meaning of One Foot Additional Draft.

It is more than probable that owners of big steamers engaged in Lake Superior trade will, just as soon as the Canadian canal at Sault Ste. Marie is open,—and it is expected to be in operation next month—order a few of their boats through the new canal with a larger cargo than it will be possible to carry through the present American lock. The subject is being discussed by vessel owners in all parts of the lakes. The first trials will probably be made with not more than an addition of a foot in draft but this will be increased if more water is found over shoal places in the Sault river than is now expected. In any event, the use of the Canadian canal is expected to result in some immediate benefit, as it is argued that southerly or south-easterly winds, which cause low water at the canals, will tend to drive the water up the Sault river from Lake Huron, and increase depths in the river when the stage of water is very low in the American lock but not too low in the new Canadian lock to permit of the passage of vessels of the deepest possible draft. This and other features of the subject are being discussed, and all with a view to taking advantage of an increase of even a single foot. On this point of one foot increase, the manager of a fleet of six vessels trading to Lake Superior says that last season one of his boats made a few trips to Gladstone, Lake Michigan, and it was found that on a draft one foot greater than that permitted in the Lake Superior trade she carried a little more than 300 tons additional cargo. Thus one foot additional draft with six steamers making twenty trips from Lake Superior in a season would cause an increase of 35,000 tons in the total of freight moved by the fleet. If these figures are correct, there is little wonder that the possible advantages to be derived immediately from the Canadian canal are being so generally discussed.

Salaries of Steamboat Inspectors.

In accordance with the act of the last congress equalizing salaries in the steamboat inspection service, the salaries of local inspectors from March 1 to June 30 of this year are as follows in the districts named: For the districts of Evansville, Ind., Louisville, Ky., Memphis, Tenn., Nashville, Tenn., Cincinnati, O., Wheeling, W. Va., Burlington, Vt., Galveston, Tex., Apalachicola, Fla., and Providence, R. I., \$1,200 per year; for the districts of Portland, Ore., Charleston, S. C., Dubuque, Ia., Marquette, Mich., Oswego, N. Y., Mobile, Ala., and Pittsburgh, Pa., \$1,500 per year; for the districts of Norfolk, Va., St. Louis, Mo., Duluth, Minn., Detroit, Mich., Grand Haven, Mich., Port Huron, Mich., and Savannah, Ga., \$1,800 per year; for the districts of San Francisco, Cal., Seattle, Wash., Albany, N. Y., New London, Conn., Portland, Me., Milwaukee, Wis., and Chicago, Ill., \$2,000 per year; for the districts of Philadelphia, Pa., Boston, Mass., Baltimore, Md., Buffalo, N. Y., New Orleans, La., and Cleveland, O., \$2,250 per year. The salary list will, of course, be revised on June 30 of this year in accordance with the returns of the different districts as to the number of vessels inspected during the fiscal year ending on that date.

Northern Line Passenger Ships.

With engines and boilers of the Northern line twin-screw passenger ship North West in good working condition, starting out next month for a second season, it is expected that she will on trials attain a high rate of speed, and that an opportunity will be offered to secure reliable information regarding her performance. The only statement ever made by the management regarding power developed in the big twin-screw quadruple expansion engines of the North West is one to the effect that on a late trip last season, and while running between Whitefish and Keweenaw points, Lake Superior, cards taken during a spurt of an hour's duration showed 6,217 I. H. P. at about 104 revolutions. It is claimed that on another spurt between the same points a speed of $22\frac{1}{2}$ statute miles was indicated by an average of three logs of different makes that were used for the purpose of checking one with another. However reliable these calculations may have been, it is admitted that there was considerable difficulty with some parts of the steamer's machinery, on account of the usual irregularities attending the operation of new engines, and especially on account of the rush with which the boat was put into commission. It was intended to attain a speed of 125 turns with the North West's engines, but it is said now that if that number of revolutions is secured under more favorable conditions this season, with a proportionate increase in the boat's speed, there will be no need of driving her so hard in order to

make the time required, and attention will be directed to economy through an adjustment of propellers to engine performance.

The North Land, which is about ready to get up steam at the ship yard of the Globe Iron Works Company, is expected to make a trial trip on May 20, and if success attends the trial on that date she will proceed immediately to Buffalo, to complete her fit-out of cabin furniture, state room furnishings, etc. About ten days later it is expected to start her on a trip to Chicago, carrying a party of officials of trunk line railways. A stay of three or four days will be made in Chicago, and from that city another excursion will be arranged for invited guests to Duluth. Returning from Duluth to Buffalo stops will be made at all ports of importance on Lake Superior. This programme is, of course, conditional upon the completion of the North Land in time to carry it into effect. If the North Land can not be used for the Chicago-Duluth trip, the North West will probably be substituted, but if the latter boat is not required for this service she will also be used before the opening of the regular season to advertise the line, as it is the intention to invite a large number of railway passenger agents to join in an excursion on her between Buffalo and Cleveland about May 25.

An Output of Ten Millions.

It is now quite generally admitted that the output of iron ore from all Lake Superior districts this season will reach 10,000,000 tons, and thus all previous records of shipments will be exceeded by about a full million tons. The principal reason for this opinion is found in the large amount of vessel capacity aside from the boats of the ore companies already engaged to move ore during the coming season. With two or three exceptions, owners whose vessels engage in the ore trade have all taken more or less ore under contract, and careful estimates made by brokers and shippers show that full 6,500,000 tons of ore has been provided for, as regards transportation. This includes of course all tonnage that is controlled wholly or in part by ore companies, as well as the tonnage that has been engaged in contracts made within the past two or three weeks, either through brokers or with vessel owners direct.

Soft coal dealers are still unable to talk of contracts, on account of uncertainties attending their business, and there has been absolutely nothing done about coal to go to Lake Superior. A few single trip charters have been made for Lake Michigan cargoes at low prices, but there is little soft coal offering at any price. Hard coal shippers at Buffalo are offering 40 cents on cargoes to go to Milwaukee.

No New Charts for Some Time to Come.

Assistants to Gen. Poe in the United States engineer office at Detroit have for some time past been engaged on one general chart of Lake Superior, as well as new charts of the St. Mary's river. It has been said several times of late that these charts, which are awaited with considerable interest by vessel masters, would be on sale about the opening of navigation this season. Such is not the case, however, as Gen. Poe says, in a letter under date of the 16th inst., that it will probably be a month before the chart of Lake Superior is completed and forwarded to Washington, and he is unable to say how long thereafter it may be before copies are ready for issue. The charts of St. Mary's river will not, he says, be completed for considerable time. The drawing has not as yet been begun, nor indeed has all the field data been obtained.

Salvage Claims.

United States judges on the lakes are evidently not disposed to encourage heavy salvage claims for towage service in cases where one steamer finds another disabled. The claim of the owners of the City of Venice for a service of twenty odd hours in towing the Wilson line steamer Spokane into Milwaukee was \$15,000. Judge Seaman of Milwaukee has just allowed them \$3,600. Their lawsuit will cost them probably \$1,000, so that it is probable that they could have secured a greater remuneration through a settlement out of court. Capt. Wilson has a claim against the steamer Wyoming, in the settlement of which this court decision will probably have an important bearing. The Wilson line steamer Sitka spent three days towing the Wyoming from Lake Michigan to Port Huron. A claim of \$5,500 was made for the service, with an offer to settle at \$4,000 if the money was paid immediately. Immediate payment was not forthcoming and now the full claim will be insisted upon.

BASIC OR ACID OPEN HEARTH STEEL?

RELATIVE MERITS OF THE PRODUCT OF BOTH PROCESSES.—MORE INFORMATION REGARDING THE BEST STEEL FOR SHIPS' HULLS.—OPINIONS FROM TWENTY-FIVE EXPERTS.

Readers of the REVIEW who have noted a discussion in previous issues regarding relative merits of acid open hearth and basic open hearth steel for structural purposes, will be interested in twenty-three letters presented herewith, from leading experts throughout the country. The discussion was begun with a view to enlightening ship owners and ship builders on the subject of the best material for hulls. There is a diversity of opinion expressed in the letters as a whole, but they may be divided as follows: Three opinions decidedly favorable to acid steel; two decidedly favorable to basic; eleven preferring acid steel, and seven expressing no preference. It is necessary to note also that one other opinion, contained in a lengthy communication which was published in the REVIEW of Feb. 14, 1895, is from a leading ship builder on the lakes and expressed a preference for the basic product. Opinions were sought on this subject from twenty-five firms or individuals having experience with the use of steel for structural purposes, and it will be noted that replies were received in all but one instance. The letters, as printed in full herewith, make a very valuable collection of information for all users of steel:

DECIDEDLY IN FAVOR OF ACID OPEN HEARTH STEEL.

WALTER KATTE, chief engineer, New York Central & Hudson River Railroad Company, New York, N. Y.:

As regards a choice between basic and acid open hearth steel for structural work, all other matters being equal, my preference is very decidedly in favor of acid steel.

GEO. H. THOMPSON, consulting engineer, New York:

There is no question in my mind as to the higher average superiority of acid open hearth over basic open hearth steel as both are usually manufactured. The qualities and properties of acid open hearth steel have become well known through its twenty years' use in the United States, while the few years of experience with basic open hearth steel, and consequent light tonnage consumed, is not sufficient to ground a conclusion respecting its quality or property as equal to acid open hearth steel. Basic open hearth steel can be made (by use of selected materials, care in making, etc.) that will simulate both the qualities and properties of acid steel; but for structural purposes, not much of the basic open hearth made with selected materials is manufactured, or if made at all, its price is higher than acid open hearth steel. The engineer is interested in knowing the magnitude or quantity of force a steel has stored up in its aggregation, (the "properties") but he is also interested in knowing how long that force will be held subject to his command—this is a matter of "quality." Now there is a distinction between "property" and "quality." Most specifications call for "property" and little is said concerning the "quality", and it is quite an easy matter to furnish "properties", but not the "qualities", and the possession of "property" is no longer a criterion for the presence of "quality". It is not enough to provide "properties", for lack of "quality" may cause failure ultimately, though seldom immediately. I have used both basic and acid open hearth steel. I know of absolute failure of bridge of basic open hearth steel, and I know of incipient failure in a number of other bridges, (of basic steel) which time will develop into absolute failures. I replaced one span (of basic steel), the pieces of which before and after failure withstood all the tests for "properties", but the absence of "quality" was microscopically shown in every piece examined, and the defects were due to gas in ingots, the usual defect (at present) in basic steels of low phosphorus quickly made; "incipiency" is the disease to which it is liable. I do not know enough about marine work to advise you as to the "quality" of steel you should use. If you wish permanent construction use acid open hearth steel, and for cabins, coal bunkers, etc., where a failure would not end in disaster, use the cheaper so called basic steels. Incidental to the acid process is the fact of the presence of "quality".

FROM A PROMINENT firm of inspectors, Cleveland, O.:

We have had considerable experience with acid open hearth, as well as basic open hearth steel during a number of years past. Both kinds of steel are in general use for structural work and both kinds have their advocates. In regard to the kind of experience which we have had with the metal will say that we are doing a great deal of work in the way of testing steel, and have made a great many tests in the last few years on both kinds of steel, and our experience, as well as our information in regard to the experience of others, leads us to favor, decidedly, acid open hearth steel. We think acid open hearth is much more reliable than either basic open hearth or Bessemer steel. The principal advocates of the basic open hearth product are its manufacturers, and their advocacy of this

metal is natural. The most that has been claimed for basic open hearth steel is that it is as good as acid open hearth. Our position as inspectors of structural steel brings us in close touch with the buyers, as well as the sellers, of this material, and we believe that you will find the general opinion largely in favor of the acid open hearth product. We have just secured the supervision of the manufacture of material for a contract calling for 30,000 tons of steel, and the acid open hearth product is preferred. On account of our position as inspectors, and having to deal with manufacturers of both products, we would much prefer not to be mentioned in your paper, as advocating either metal particularly. The large manufacturers understand pretty well where we stand on this question, but you can readily see that it would not do for us to be in the position of advocating the product of one mill as opposed to that of another. If a purchaser wants basic open hearth steel and appoints us inspectors to see that he gets what he specifies, it is our business to see that he gets good basic steel, but not to go before the public and advertise the fact that we think acid open hearth is better. The basic steel is cheaper and, of course, for some purposes may be just as good as the acid open hearth.

DECIDEDLY FAVORABLE TO THE BASIC PRODUCT.

UNION DRY DOCK COMPANY, Edward Gaskin, superintendent, Buffalo, N. Y.:

We have used both acid and basic open hearth steel and can not see enough difference between them to warrant us in giving preference to either process. In our judgment, the price being equal, there is no choice.

FROM THE MANAGER of one of the leading ship building plants of the lakes:

I have had considerable experience with both acid and basic open hearth steel for ship construction and would say, on the whole, the basic has been the more satisfactory and all other matters being equal, we would prefer it. I may say that I was exceedingly surprised at your original article on the subject, so much so that, although as a general rule I dislike newspaper controversies and keep out of them, I had partially prepared an answer to it when the letter signed "Subscriber" appeared. I may yet decide to say something on the subject later and would, therefore, prefer that my name be not used in connection with this letter.

PREFERENCE FOR THE ACID OPEN HEARTH PRODUCT.

J. G. GREINER, engineer of bridges, Baltimore & Ohio Railroad Company, Baltimore, Md.:

I use both kinds of steel and make no discrimination, although for a medium steel, that is, one with an ultimate strength of over 56,000 pounds, the acid open hearth is more reliable and apt to be more uniform in quality. It is, however, difficult to make an acid open hearth steel uniform with a lower ultimate strength than about 56,000 pounds. In the basic open hearth steel, the phosphorus can be almost entirely eliminated thereby making the softest kind of steel, and when a very soft steel is desired, the basic metal is preferable, although each heat must be tested as there is some danger of the metal absorbing a large quantity of phosphorus from the lining of the furnace. Steel made by the basic process is still in its infancy and more or less experimental, and we, therefore, would be on the safer side in using the acid open hearth whenever possible.

CHARLES E. HEWITT, treasurer, New Jersey Steel and Iron Company, Trenton, N. J.:

We are not manufacturers of steel. We will, however, give you our opinion. We have been users of large quantities of both acid and basic open hearth steel for bridge and constructional purposes, but not for ship construction, and in our use of the material we have not as yet found any practical difference between the two. Our opinion, however, is that since in the acid process it is necessary to use a higher grade of raw materials the chances of getting a poor product are less than the chances of getting a poor product in the basic process. We should say, therefore, that the chances of inferior material finding place in a finished structure are greater in the case of basic than in the case of acid steel. This supposes that even with modern inspection there is a probability of inferior material getting through.

A. C. CUNNINGHAM, American Engineering and Inspection Association, New York, Albany, and Wayne, Pa.:

I have been constantly employed during the past eight years in testing the properties of bessemer acid and basic steel, a portion of the time on the manufacturer's side. I enclose you under separate cover a copy of our new general specification and notes, by the proper use and enforcement of which good steel can be obtained by any process, provided it is capable of making good steel; if it is not, then with this specification, its defects can be discovered and the steel rejected. Of course it is not sufficient to simply charge this specification into the furnace along with the melting stock, or to depend upon an inexperienced or careless man to get the best results with it, but I think you will find that anyone posted in steel making would ask for no better protection. Experience, facilities and intentions being equal, acid open hearth is superior to basic

open hearth, from the very nature of the two processes. As these factors are never equal, however, some acid steel is superior to some basic, some basic to some acid, and, on occasion, Bessemer steel may be superior to either. Before forgetting it, I would like to call your attention to a special use that can be made of our specification. It can be submitted to a manufacturer in blank form with request that he fill it out for what he considered the best steel for certain purposes. This is rather a trying ordeal to put a man to, I will admit, and may bring out some of the peculiarities and possibilities of his product. You have tackled a big subject, and may find that you have run into some of the "heavyweight" manufacturers before you get very far with it. I do not question, however, that if you keep it up you will do lots of good, both for acid and basic steel. If you go about it right you can make a demonstration of your own, at a moderate expense, of the comparative merits of basic and acid steel that will be independent of personal opinions and would bring your publication into great prominence.

AMERICAN BRIDGE WORKS, Chicago, Paul K. Richter, president:

We have had several years' experience with acid open hearth steel, while with the basic open hearth we have had but about two years' experience. Both of them have proved very satisfactory materials. For our own use, we prefer the former at an even price, but simply for the reason that we have had longer experience with it. Our experience with the basic steel, as far as it goes, has been eminently satisfactory.

WILLIAM CRAMP AND SONS SHIP AND ENGINE BUILDING COMPANY, Philadelphia, Pa., Henry W. Cramp, treasurer and secretary:

For hull plates there is not much difference in the relative value of basic open hearth and acid open hearth steel. For shapes, that is to say angles, beams, bulbs etc., we prefer acid open hearth, but basic steel is also used for these purposes. For boilers we usually specify open hearth steel by the acid process. However, we wish you to consider our opinion limited in its scope to our own practice, and not to be taken as proving or condemning any particular process of steel manufacture.

FROM A MECHANICAL engineer and contractor of Pittsburgh, Pa.:

I have had considerable experience both with acid and basic open hearth steel. Strictly first class steel can be made by either process, but in practice the acid steel is apt to run somewhat more uniformly through a large number of heats than the basic, for the reason that the phosphorus contents of the steel are not dependent at all upon the manipulation of the furnace in the case of the acid process as they were in that of the basic.

AUG. MORDECAI, assistant chief engineer, N. Y., L. E. & W. R. R. Co., Cleveland:

I think the product depends a great deal upon the manner in which it is manufactured. In our specifications we make no difference, receiving either acid or basic, but my experience would lead me to think that the acid process is preferable; that is to say, if you buy indiscriminately in the market, the steel made by the acid open hearth process would be better than that by the basic, although I have no doubt that special specimens of the basic would be equal if not superior to other specimens of the acid.

FROM ONE OF THE LEADING eastern ship building concerns:

While we do not wish to be quoted, we do not hesitate to say that our own preference is for acid open hearth steel. It may be more a notion than otherwise, for we are frank to say that we have not had any unpleasant experience with basic steel. But the latter being made from a lower grade of material naturally prejudices the mind at the start, although careful manipulation may produce a metal which will stand all requirements. To make a long story short, acid open hearth steel is good enough for us, and we somehow feel a little safer in using it.

AUG. ZIESING, engineer and manager, Lansing Bridge and Iron Works, Chicago, Ill.:

I think the general impression among bridge engineers is that acid open hearth steel is the best and most reliable of the three different kinds, and I am inclined to be of the same opinion, although I am hardly prepared to say that the basic open hearth does not fill the requirements of bridge builders just as well. We have used a great deal of this steel and have no fault to find with it. When made to a proper specification I think it runs very uniform throughout the same piece and different pieces of the same melt. I would say as a matter of possible interest, that what little trouble we have had with this steel has occurred in very cold weather, but am not prepared to say that acid open hearth would not have acted in the same way.

HILTON BRIDGE AND CONSTRUCTION COMPANY, Albany, N. Y., E. Sweet, president:

My earlier experiences with basic steel were unsatisfactory and I have latterly used and specified acid steel instead. I am, however, unable to say from experience that improvements in the manufacture of basic steel have not now placed it on an equality with the acid product.

FRANK E. KIRBY, engineer, Detroit Dry Dock Company, Detroit, Mich.:

We have never used basic steel, so cannot say anything about it from

personal knowledge. I understand that Lloyd's classification society allows its use under some special provision.

NO PREFERENCE AS REGARDS PROCESS OF MANUFACTURE.

BOSTON BRIDGE WORKS, Boston, Mass., A. L. Miller, Jr., secretary:

We do no ship work and have found that for our work either basic open hearth or acid open hearth steel has been satisfactory.

WM. H. BROWN, engineer, the Pennsylvania Railroad Company, Philadelphia, Pa.:

We have not as yet had a very wide experience in the use of steel for structural purposes. As far as our experience goes, however, we think that we are able to state positively that basic open hearth steel ranging in ultimate strength from 50,00 to 60,000 pounds per square inch and having a low percentage of phosphorus, say not more than .04 of 1 per cent., is a perfectly reliable material, and may be substituted in any specification for wrought iron, using the same working stresses as in the case of wrought iron. Our experience with acid steel has been somewhat less than with the above material, but we are inclined to think that this material is also entirely reliable, especially when a higher ultimate strength is required, say up to 70,000 pounds per square inch.

FROM A LEADING civil engineer of New York:

I have used both acid and basic open hearth steel in considerable quantities in bridge construction, more particularly in the last five years. I have made no distinction between the two metals, considering one as good as the other, excepting that while I have required the maximum amount of phosphorus in acid open hearth not to exceed .08 of 1 per cent., I have made the requirement in basic .04 of 1 per cent., for the reason that in order to get the proper amount of work in basic open hearth steel the phosphorus is naturally reduced much lower than in acid steel. The above requirement for the phosphorus in basic steel is very easily obtained and in the last three structures which I built I should say that the average phosphorus was nearer .02 per cent. than anything else. I should say that I had used considerable in excess of 10,000 tons of basic open hearth steel in the last five years. While I am perfectly willing to have it known that I take this stand in this matter, I would prefer that you would not publish my name in connection with any remarks that you may have to make.

M. J. BECKER, Pittsburgh, Pa., chief engineer, Pennsylvania Lines West of Pittsburgh:

Upon the receipt of your letter, I requested Mr. C. P. Buchanan, our inspector of bridges, to give me his views regarding the merits of acid open hearth and basic open hearth steel, and I give here his reply: The actual results obtained in the manufacture of steel are still so varied that one would be presuming a great deal were he to say positively that one method is better than the other. One maker uses the acid process exclusively, and gets results that are seldom marred by failures; another uses the basic alone, with perhaps as small a percentage of actual rejections. One maker only, where I have knowledge of the product, uses both methods, and the opinion of the management there accords with our experience, viz., that for medium steel, say from .20 to .25 carbon, the acid open hearth gives better results, while for dead soft steel the basic process is preferable. However, in practice it is almost impossible to realize the condition of "all other matters being equal," and choice of process at this time would be perceptibly influenced by my knowledge of the maker, though as I have said our investigations in connection with material already used tend to confirm the opinion quoted above.

G. W. G. FERRIS & Co., inspectors of iron and steel for structural purposes, Pittsburgh, Pa.:

Basic open hearth and acid open hearth steels with similar chemical analyses are equally reliable for constructional purposes of all kinds. We have had experience with the basic steel ever since its introduction into this country.

FOX SOLID PRESSED STEEL COMPANY, Clem Hackney, general manager of works, Joliet, Ill.:

I am sorry to say that I am not in a position to make a reply to your letter that would be satisfactory to either you or myself, as I have never had any experience whatever with the use of steel for ship construction. As far as structural work is concerned, it would, in my opinion, be hard for anyone to decide which of the three named would be the best to use.

CHICAGO BRIDGE AND IRON COMPANY, Washington Heights, P. O., Ill.:

Both acid and basic open hearth steel, as we find them in the market, are very satisfactory material, and we believe that the feeling of advantage of one steel over the other is more prejudice than judgment based on experience. Poor steel may be made by either process, but with reasonable care good steel is made by each. The advantage, in our judgment, is entirely in the facility with which the different processes are managed. If basic steel can be made of a given quality for less money than acid, it surely will come in general use. If acid open hearth steel can be made cheaper than basic we shall use acid steel. These are questions for the steel mill rather than for the consumer of the finished product.

Around the Lakes.

A channel 300 feet wide and 20 feet deep is promised at Two Harbors and Fort William. The Canadian government is doing the work.

Hand & Johnson, Buffalo tug owners, have purchased the new tug on the stocks at the ship yard of the Union Dry Dock Company in that city.

Anyone in need of an experienced draughtsman for marine engine and boiler design can learn of a man by addressing the MARINE REVIEW.

Capt. J. B. Hall of Cleveland is to join Capt. A. Clark of Buffalo in the vessel brokerage business. The name of the Buffalo firm will remain unchanged—A. Clark & Co.

The Welland canal will be open on Monday next. Canadian tug owners have fixed up their differences and will maintain rates at figures about the same as those of last year.

The manager of the Western Union Telegraph Company at Sault Ste. Marie announces that his office at the canal will be open day and night during the season of navigation, and an all-night delivery will also be a feature of the service.

Frederick D. Wheeler, brother of Hon. F. W. Wheeler of West Bay City, died at his home in that city, Monday, aged forty-seven years. He had been engaged in the management of the ship yard until September, 1893, since which time he has suffered from illness that resulted in death.

Beginning with the opening of navigation on Lake Superior, the stage of water in St. Mary's Falls canal, as issued by the official in charge of the weather bureau at Sault Ste. Marie, will be for twenty-four hours from 8 a. m. and 8 p. m. respectively, of the date of issue, instead of thirty-six hours as during last season.

Saturday, the 20th, is the date fixed for the launching of the steel steamer building at the yard of the Cleveland Ship Building Company for M. M. Drake and others of Buffalo. Mr. R. R. Rhodes of Cleveland has decided to honor his son's college by giving the name Yale to the big 400-foot boat building for him at the same yard.

Through the efforts of the Lake Carriers' Association the charge for trimming ore at all shipping ports excepting Two Harbors is now 2½ cents a ton. The latest contract is with Escanaba parties who agree to do the work at 2½ cents. An effort is being made to establish the same rate at Two Harbors where the charge last season was 3 cents.

Officers of Huronia M. E. B. A. of Port Huron are as follows: Past-president, Eli Swartout; president, George A. Miller; first vice-president, W. P. Boynton; second vice-president, E. M. Murdock; recording secretary, C. J. Miner; corresponding secretary, J. A. Southgate; financial secretary, W. Thorn; treasurer, A. Anson; chaplain, P. Finney; conductor, H. Depuy; door-keeper, H. Rondeau.

Capt. Alex. McDougall is nothing if not original. His latest proposition is to make a new state of the northern portions of Michigan, Wisconsin and Minnesota, which comprise the iron ore districts of Lake Superior. He would call the new state Superior. It would be great in mineral wealth. The idea is an enlargement of the scheme long talked of to make a state of the upper Michigan peninsula.

At West Superior, Wednesday, the American Steel Barge Company launched the whaleback steamer that has been on the stocks for several months past. She is 320 feet long and is named John B. Trevor. The two tank barges building at the same yard for the Standard Oil Company will be launched on Wednesday next. This will leave the stocks clear at the barge company's yard. There has been no announcement of any change in the decision of the company to suspend building on its own account for some time to come.

Within a week or two a couple of tugs will go to Erie to tow to Cleveland a dredging outfit, consisting of a dredge with 1,200 yards capacity per day and two scows. Considerable figuring was done during the past year by Capt. W. A. Collier, general manager of the Cleveland Dredge Company, which is the name of the concern operating the plant, with reference to having a couple of powerful dredges built, but this project has been set aside for a time and this apparatus, ready for service, has been purchased. By the time the 20-foot channel necessitates dredging in lower lake harbors, this company intends having a dredging plant of sufficient capacity to care for the largest contracts.

New bids on Cleveland's five-year harbor dredging contract were opened again Wednesday. The lowest bidders are William E. Rooney of Toledo, who offers to do the dredging for 12 cents per cubic yard and log towing at \$8 per hour, and the Cleveland Dredge Company submitting a bid half a cent per yard higher for dredging but 20 cents an hour lower on tug service. The Cleveland Dredge Company is the new concern organized by W. A. Collier of the Vessel Owners' Towing Company. Of course the firm of L. P. & J. A. Smith is very much interested in this contract. The Cleveland Dredge Company is directly opposed to the Smiths, but its bid is not the lowest. There is no telling who may do the work until it is finally begun.

Stern Tunnels of the Olympia.

The following reflections have been suggested by an examination of drawings showing the method adopted for enclosing and supporting outboard ends of the screw shafts of the United States cruiser Olympia, built by the Union Iron Works, San Francisco, Cal. :

In that vessel the outboard ends of the screw shafts for a length of 24 feet (the distance between the forward end of the stern bearings and the stuffing boxes through which the shafts emerge from the hull of the ship) are enclosed in tubes 3 feet 9 inches internal diameter at their forward ends and 2 feet 10 inches where they join the stern bearings. Each of these tubes is made of steel one-half an inch thick, and is connected to the hull throughout its length by a box or cell formed of steel plates three-eighths of an inch thick, stiffened with angle irons. This box has an average depth (measured on a line approximately parallel with the outside of the hull) of 3 feet 10 inches at its forward end and 6 inches at the forward part of the stern bearing. It will, therefore, be evident that this cellular connecting box tapers at a much more rapid rate than the tube which it supports. This is done probably to afford the water as free a run to the screws as possible; but this intention is in no small degree defeated by the fact that the bracket arms which support the stern bearing are attached to the hull at points considerably above and below the after thin end of the cellular structure referred to, and have to be dragged through the water, and must, by whatever resistance they oppose, impair the speed of the ship.

These brackets, it is true, are quite similar to those in common use for many years for the support of the stern bearings of twin screw shafts; and if there were no better method of accomplishing such support, criticism would have no claim against them; but, as it is well known, there is a better way of attaining the end sought, and, therefore, in a cruiser whose speed at a critical time may involve her own safety and that of her personnel, such improved methods should have been adopted.

The steel tubes above mentioned as inclosing the shafts are, strange to say, not water tight, but, on the contrary, are filled with water, the presence of which seems to have required the casing of the shafts (which are of steel 16 inches in diameter) with a bronze tube (closely fitting it) one inch in thickness and 31 feet in length. The weight of each of these bronze casing tubes is about 6,000 pounds; furthermore, the water which surrounds each shaft will weigh at least 10,000 pounds, which, added to the weight of the bronze casings of the shafts, makes a weight of 16,000 pounds on each side of the stern of this ship, or 32,000 pounds in all, of load which must be sustained and dragged through the water, and consume power for no useful purpose whatever; moreover, in the pitching and rolling of the ship, this useless dead weight subjects the vessel to strains which are totally unnecessary, and which the adoption of modern practice would have avoided.

Just why this faulty construction has been adopted by the navy department is not evident. There are rumors that some of the other new vessels are to be built in the same way. It is well known that there are several vessels afloat in which the tubes enclosing the screw shafts are accessible from the interior of the ship throughout their length up to the forward end of the stern bearing, where the stuffing box is placed. This construction makes it unnecessary to encase the shafts with bronze, and allows for their examination at any time. By this construction the extra buoyancy due to the displacement of the shaft tubes is secured, and there is, of course, no strain on the vessel due to a mass of dead weight. This construction is no experiment, but has been used for several years, and so satisfactory has it been found, that the Cramp company has adopted it for the new American liners St. Louis and St. Paul. In view of what has been done in the matter of shaft tunnels for twin-screw vessels, it does seem that the navy department took a step (if not a tumble) backward, when it enclosed the shafts of the Olympia with tubes filled with water.—Scientific American.

A large number of letters from experts in the steel industry, presented elsewhere in this issue, will prove interesting to lake ship builders, who have been using both acid open hearth and basic open hearth steel in ships' hulls. In this connection the opportunity is taken to correct an erroneous statement that appeared in a previous issue. It was said that several of the European governments had prohibited the use of basic open hearth steel in government work of a structural kind. Basic Bessemer and not basic open hearth steel was the product that had been disapproved of in the works referred to.

A list of Canadian and American life saving stations on the lakes and a table giving dimensions of all lake dry docks are features of the latest "Notice to Mariners" (No. 2, 1895), just issued by the hydrographic office. The pamphlet also contains several pages of notes about changes in aids to navigation, shoals, etc. A copy of it will be forwarded to any master of a lake vessel upon application to the hydrographic office at Washington, or the branch offices in Cleveland or Chicago.

Matters Pertaining to Draft of Water in the Rivers.

From numerous soundings taken by J. W. Westcott at Detroit on the 17th inst., it was found that the average depth of water throughout the day was 13.9 inches below the zero mark, as against 4.4 inches below zero on the same date in 1894. Of course there is more ice now than there was a year ago. The St. Clair river is blocked now, while a year ago there was no ice. Mr. Westcott advances the opinion that as soon as the ice disappears the water will rise to about the stage of last year, but this is only a guess. The rocks at the foot of Lake Huron and between Ballard's reef and the Lime-Kilns have not, he says, been removed as yet, but this will be the first work undertaken by the engineers, and it will be begun in a few days. Water at Sand Beach during March registered 5 inches lower than during the same month a year ago, but there is much ice on Lake Huron. Although there is no report of soundings at Grosse point it is thought that the water is about the same as last year, or rather will be as soon as the ice jam is broken.

Proposed New Ranges.

Signatures of vessel masters are being attached to a petition to the light-house officials of the eleventh district favoring the establishment of range lights on Birch point, west of Round island, above the Sault. Ranges on Round island point do not, it is claimed, fully protect vessels from the danger of shoal spots in that vicinity. The proposed ranges on Birch point would enable vessels bound down the river to take a course from Whitefish point, which course would be parallel to the course now taken by vessels, but distant north-easterly therefrom about 4,000 feet. Descending vessels would come in on the Birch point ranges to a point where the same intersects the present ranges on Round island point. Vessels would thus keep further away from Point Iroquois, and would at all times when on the Birch point ranges have at least 35 feet of water.

Detroit Notes.

Managers of the Detroit Dry Dock Company evidently feel quite confident of securing the order from the Cleveland and Buffalo Transit Company for the big side-wheel steamer that has been under consideration for some time past, but they are giving no reasons for their faith in the matter. It is understood that the boat is to have a third more power than the big boats of the Detroit & Cleveland line, and great speed is expected of her. The dry dock company has had steam up on the new side-wheel steamer Arrow, which is to run between Sandusky and the Lake Erie islands, and they will on Saturday launch the lumber steamer building for C. R. Jones and others of Cleveland. She will be named Argo. The Sandusky side-wheel boat is a very trim looking craft. She very much resembles the Frank E. Kirby.

Alike to other ship and engine building concerns, the dry dock company is entering into new branches of engineering work in order to keep its several departments in operation when lake ship building operations are not active. As a result of the recent visit of Messrs. Kirby and McMillan to Europe, the company will shortly begin the construction of gas motors of all sizes up to about 25 horse power. Important advances have been made of late in the application of gas motors to various uses throughout Europe, and the dry dock company has secured patent rights that will enable it to be among the first in the field in this country.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store and afloat at the principal points of accumulation on the lakes on April 13, 1895:

	Wheat, bushels.		Corn, bushels.	
	In store.	Afloat.	In store.	Afloat.
Chicago	23,066,000	3,190,000	4,848,000	2,530,000
Duluth	12,363,000	85,000
Milwaukee.....	701,000
Detroit	994,000	591,000	162,000
Toledo	1,630,000	299,000	726,000
Buffalo	2,056,000	79,000	104,000	281,000
Total.....	40,810,000	4,244,000	5,840,000	2,811,000

The group of pictures of 150 commanders of lake vessels, 29 by 23 inches, photogravure, will be mailed to any address by the MARINE REVIEW, Cleveland, O., for \$5. The original price was \$7, and it was worth it. No more interesting picture for lake men could be published. It will attract attention wherever it is placed. For \$3 extra the picture will be enclosed in a handsome frame.

The Glasgow Herald states that the White Star Company is to build a cargo steamer which will surpass anything of its class afloat. With a registered tonnage of 9,000 to 10,000, the vessel will be capable of carrying 15,000 tons of cargo on a coal consumption of less than 2 cents per ton of cargo for 700 miles. The new vessel will be built at the Belfast yards, where the Lucania and Campania were constructed.

In General.

E. L. Corthell, the eminent civil engineer who has been abroad for about a year in the hands of physicians, has returned to New York in good health.

Three branches of the Marine Engineers' Beneficial Association in New York have joined forces under the name of Consolidated No. 33, M. E. B. A.

As an indication of interest taken in yachting in this country, it may be noted that one New York newspaper which asked for suggestions for names for the new American cup defender received no less than 50,000 letters containing suggestions of over 300,000 names, about 14,000 of which were printed.

Engines of the two new battleships authorized by the last congress will be twin triple expansion of about 10,500 horse power, duplicates of the engines of the battleship New York. The six gunboats, which are to be of about 1,000 tons displacement and 10 to 12 knots speed, will each be supplied with one horizontal direct acting triple expansion engine of about 750 horse power. The three torpedo boats, authorized by the same act, will be of about 180 tons each. This is about forty tons smaller than the British torpedo boat chasers of the Havoc class, the fastest vessels afloat, yet the American boats will be required to attain a speed of 28 knots. Plans for the torpedo boats are not as well advanced as those of the battleships and gunboats.

At the late meeting of the Institute of Naval Architects in Stratford, England, an instrument was exhibited that was of special interest to the men of ship building science who were present from different parts of Europe. By its use the angle of heel of a ship may be read by means of the flow of fluid in a vertical column in like manner to the reading of a thermometer. On the left-hand side is a scale of degrees, the motion being 2 inches for each degree, while on the right-hand side is another scale from which the metacentre height in inches is given. Success with the instrument in practical use is confidently expected, as the inventor, J. Winhurst, is a man of well-known scientific ability and a full acquaintance with the subject. The instrument will probably supersede the use of the pendulum, which is untrustworthy, for the purpose of inclining and other tests of the same nature; and further, as it is either quick or slow in its action, as required, and is always on the dead-beat principle, it may very well be used when the vessel is not in still water.

A correspondent who favors Scotch boilers with improved draft appliances, as against water tube boilers, and who shows considerable interest in several articles published in the REVIEW of late about the steamers Seaford and La Tamise—the former having Scotch and the latter Belleville tubulous boilers—sends us the following: "I have just been informed by a reliable firm of English engineers, that while the cylindrical boilers in the Seaford occupy 37 feet of length, the water tube boilers in La Tamise occupy 53 feet of length, which as a matter of course in ships carrying cargo is of very great importance, or for that matter in all ships. The percentage of additional space that the water tube boilers take up is therefore 42. Add this to the 36 1/3 per cent. more fuel that these water tube boilers require, and the area for cargo in a vessel is reduced materially, to say nothing of the increased cost and tonnage of the coal to run ships with these tubulous boilers in them."

Diagrams Accompanying Communication From Richard P. Joy, on Page II.

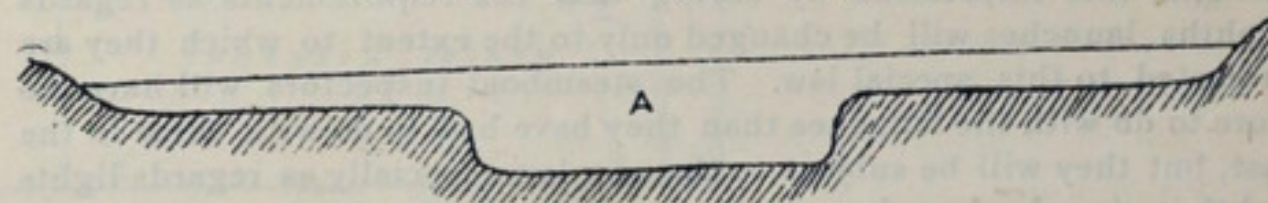


FIG. 1. LIME-KILNS BEFORE DREDGING.

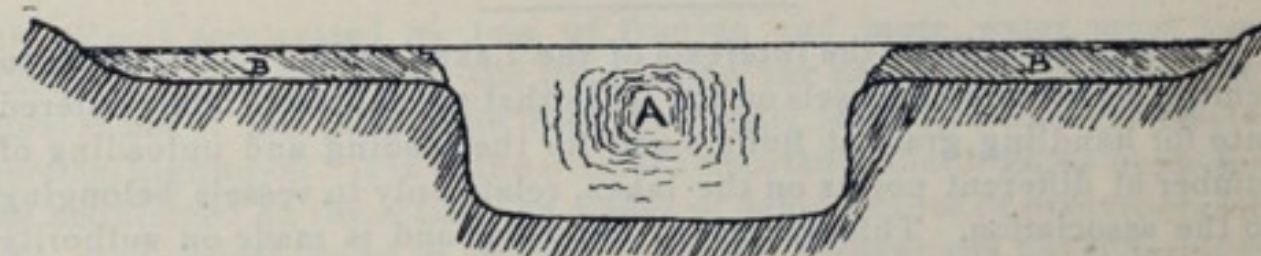


FIG. 2. LIME-KILNS AFTER DREDGING.

A COPY OF THE PHOTO-GRAVURE SUPPLEMENT OF DIRECTORS OF THE LAKE CARRIERS' ASSOCIATION, TOGETHER WITH THE LARGE ENGRAVING OF THE STEAMER NORTH WEST, BOTH OF WHICH WERE CONTAINED IN RECENT BIG ISSUES OF THE REVIEW, WILL BE MAILED IN A PASTEBOARD TUBE TO ANY ADDRESS UPON RECEIPT OF 50 CENTS IN STAMPS.

An injustice was done a good steel boat, the steamer J. B. Ketcham, in saying that she was among several vessels recently found to have wet grain cargoes in Chicago. It was another of the Ketchams, the W. B., that was meant.



DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 516 Perry-Payne building, Cleveland, O.

SUBSCRIPTION—\$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department contain the names of 3,341 vessels, of 1,227,400.72 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons and over that amount on the lakes on June 30, 1894, was 359 and their aggregate gross tonnage 634,467.84; the number of vessels of this class owned in all other parts of the country on the same date was 316 and their tonnage 642,642.50, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1894, was as follows:

Class.	Number.	Gross Tonnage.
Steam vessels.....	1,731	843,239.65
Sailing vessels.....	1,139	302,985.31
Canal boats.....	386	41,961.25
Barges.....	85	39,214.51
Total.....	3,341	1,227,400.72

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30,	Number.	Net Tonnage.
1890.....	218	108,515.00
" " " 1891.....	204	111,856.45
" " " 1892.....	169	45,168.98
" " " 1893.....	175	99,271.24
" " " 1894.....	106	41,984.61
Total.....	872	406,976.28

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.
(From Official Reports of Canal Officers.)

	St. Mary's Falls Canal.			Suez Canal.		
	1894.	1893.	1892.	1894.	1893.	1892.
No. vessel pass'ges	14,491	12,008	12,580	3,352	3,341	3,559
T'n'ge, net registd	13,110,366	9,849,754	10,647,203	8,039,105	7,659,068	7,712,028
Days of Navigat'n	234	219	223	365	365	365

Entered at Cleveland Post Office as Second-class Mail Matter.

IN A communication published in the REVIEW last week, Gen. James A. Dumont, chief of the steamboat inspection service, gave it as his opinion that all vessels propelled by machinery, by naphtha or other motive power, are subject to all the provisions of the new White law for lake navigation, (act of Feb. 8, 1895,) so far as the provisions can be made applicable thereto, particularly in the matter of lights and the general rules of navigation. This was taken to mean that naphtha launches on the lakes would be made subject to all of the rules of the inspection service, as applied to steam vessels, such as annual inspection, licensing of officers, etc., but Gen. Dumont, who was in Cleveland during the week, corrects this impression by saying that the requirements as regards naphtha launches will be changed only to the extent to which they are subjected to this special law. The steamboat inspectors will have no more to do with the launches than they have had to do with them in the past, but they will be subject to the new law especially as regards lights and the general rules of navigation, and it will be the duty of customs officials to see that they comply with these provisions.

IT MAY be well for the interests of the Lake Carriers' Association to remind all owners of vessels on the lakes that the contracts lately entered into for handling grain at Buffalo and for the loading and unloading of lumber at different points on the lakes, relate only to vessels belonging to the association. This statement is official and is made on authority from officers of the association. If a cargo of grain arrives at Buffalo on a vessel not belonging to the association, Mr. Kennedy is in no way bound to do the shoveling at his contract rate. He may make a special bargain as he chooses for the handling of such grain, and may charge the old rates for handling it. It will thus be readily understood that it is quite important that all vessels engaged in the grain or lumber trade should hold membership in the association. The contractors at Duluth, Buffalo and Cleveland will all be furnished with lists of association vessels.

EACH YEAR it is becoming more evident that the middle men must give place to more direct dealings in the vessel business of the lakes. This spring the most important instance of this change in condition, comes from Duluth, Chicago and other grain shipping ports, where con-

tracts covering insurance on grain have reduced charges to figures that appear only nominal as compared with rates of the past. Commissions on premiums derived from insurance on grain cargoes have formed the principal source of revenue in the vessel brokerage business of Chicago and other grain shipping ports in the past. Now they will be entirely wiped out in some instances and generally reduced to a basis that will allow the broker little profit. This is the tendency in all branches of lake business. It is at present most noticeable in insurance, as commissions have been highest in that branch of the trade.

STATE LEGISLATURES and commercial bodies of northwestern states are ever ready to join any effort to secure deep water communications between the lakes and the Atlantic seaboard. Although there is at present no agitation of this subject, the legislature of Minnesota a few days ago passed, under suspension of its rules, a memorial urging continuance of the present lake works and an extension of the system in the interest of the business development of the state. This spirit among representatives of Minnesota is indicative of the great interest that is at all times manifested throughout the entire northwest in the development of lake commerce.

John N. Kirby, President M. E. B. A. No. 2.

The portrait of John N. Kirby, printed herewith, is taken from a very neat manual and directory just issued by the Marine Engineers' Beneficial Association, No. 2, of Cleveland. Although a young man, Mr. Kirby has



been in charge of triple expansion engines built by the Globe Iron Works Company, Cleveland Ship Building Company, Detroit Dry Dock Company and S. F. Hodge & Co. He is now president of the Cleveland organization of engineers, and has held the positions of vice-president and corresponding secretary. He has also represented the association in the national conventions of 1894 and 1895.

While Admiral Meade's squadron was under way recently, an experiment was made to test the utility of search lights for long distance signalling. The Minneapolis was ordered to steam ahead of the squadron, and, having gained a distance of twenty miles, to try to open signal communication with the flagship by using her search lights, elevated at an angle of about 45°. The cruising speed was 13 knots, but the Minneapolis had no difficulty in gaining her distance in about seven and one-half hours, without using any additional boiler power. Signals were made and understood with ease.

The importance of the new German ship-canal is set forth in "The Progress of the World" in the April Review of Reviews. The editor recalls the fact that the Straits of Cattegat, from which shipping will be diverted by the new canal, once levied heavy tolls on our merchant marines, and that our government took the lead in securing freedom of navigation through them.

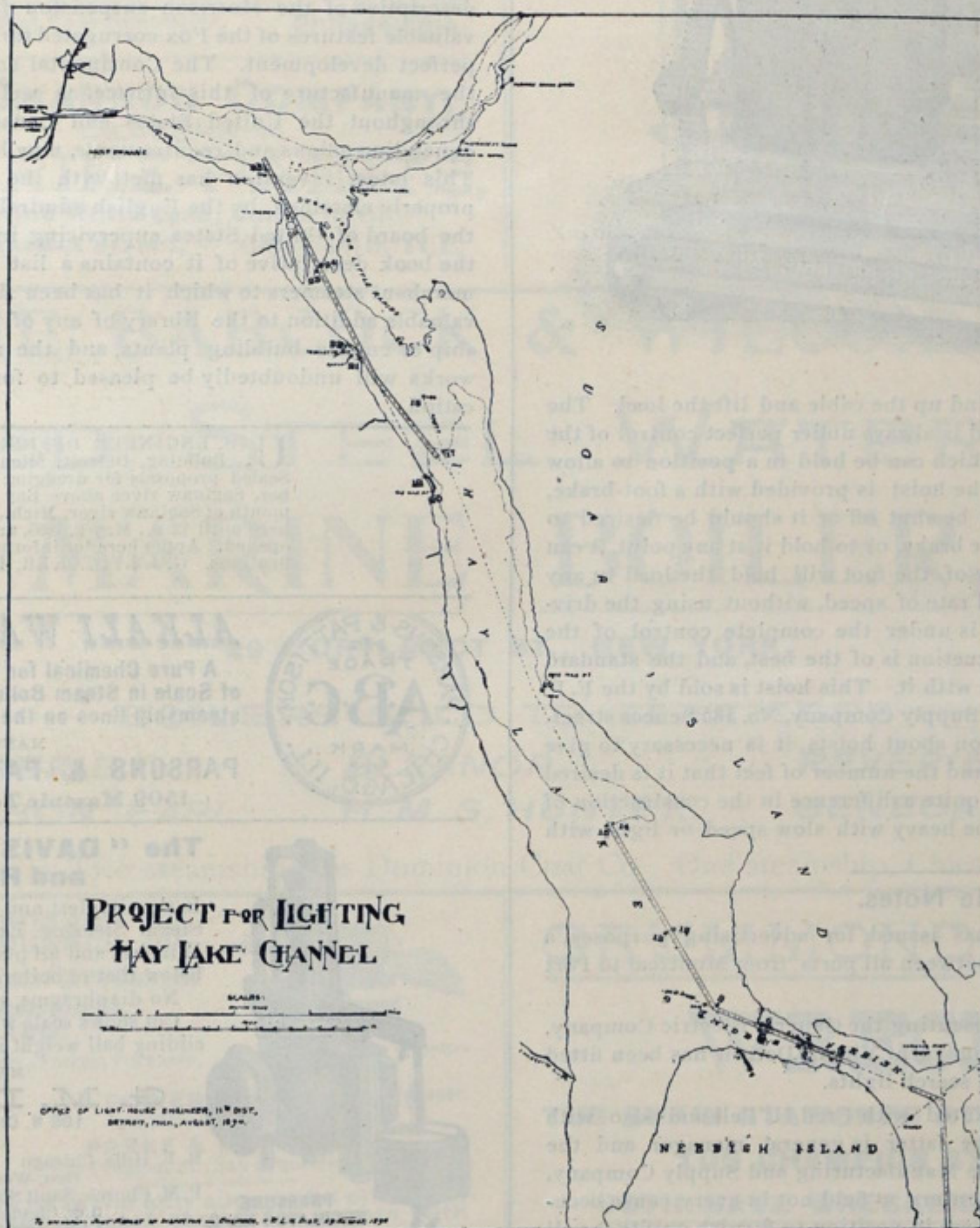
An Effective Strengthening Arrangement.

The steel freight steamer J. H. Wade, owned by the Cleveland Rolling Mill Company and managed by Capt. W. C. Richardson, has recently been strengthened at the ship yard of the Globe Iron Works Company in a manner that would indicate the determination of her owners to keep their vessel up to the highest possible standard. The Wade was hardly more in need of alterations tending to increase her strength than numerous other steel vessels on the lakes, but her manager and owners decided to make her capable of withstanding, for many years, the wear and tear incidental to the ore trade, in which she is engaged. The topsides have been doubled with six plates, each 28'x51"x $\frac{9}{16}$ ", one plate 20'x51"x $\frac{9}{16}$ " and one plate 16'x51"x $\frac{9}{16}$ " on each side of the steamer. The sheer strakes have been doubled on both sides by seven plates, each 28'x50"x $\frac{5}{8}$ " and one plate 14'x50"x $\frac{5}{8}$ ". The new sheer strakes extend down from the top of the gunwale bar and overlap the original topside plates 18 inches and the topside doubling plates 14 inches, thus making an exceptionally strong connection between the gunwale and side of the hull.

Another Feature of the Lake Levels Question.

Editor MARINE REVIEW: As the subject of lake water levels is being discussed to a great extent in the newspapers, on account of the fear that Chicago's drainage channel will lower the level of the lakes, I desire to call the attention of your readers to a problem which must claim the attention of vessel owners at a not very distant day and that is the effect of dredging at the Lime Kilns crossing, Detroit river.

It is a well known fact that the level of the lakes has been constantly lowering for some years, or since this channel (Lime Kilns) was deepened and widened. The statement of the government engineers, that if the cross section remains the same, the discharge of water must be the same, is not in accord with the teachings of science nor universal experience, as may be seen illustrated in the enclosed sketches. Fig. 1 shows the river as it was originally, before any dredging had been done; then friction held back the flow as effectually as a dam. In Fig. 2, although the cross section is the same as in Fig. 1, (for the reason that the earth removed from the channel is thrown in the shoal water on either side)



PROJECT FOR LIGHTING HAY LAKE CHANNEL—LIGHTS INDICATED BY NUMBERS, BEGINNING AT LOWER ENTRANCE TO CHANNEL—TIME OF COMPLETION OF LIGHTING SYSTEM NOT YET FIXED.

The total length of the new doubling is 210 feet on each side and extends from 6 feet forward of the forecastle bulkhead to 3 feet abaft of the engine room gangway. All the plates have been carefully fitted edge to edge of the original plates and are in perfect metallic contact with the same, as all the old paint was completely scraped off. The sheer and side plate butts are all connected by triple riveted straps of ample dimensions for $\frac{7}{8}$ inch rivets, thus making the strongest possible connection. All the original holes were drilled from $\frac{3}{4}$ inch to $\frac{7}{8}$ inch, to obtain fair holes and a proper area of riveting, the whole of which is perfectly efficient and tight. The bottom has recently been repaired and is now in first class condition. The hold ceiling has been partly renewed and made good and the hull is newly painted. The work was done under the supervision of Joseph R. Oldham, as representative of the owners, who says the arrangement is the best he has ever seen carried into practical effect, and it has made the Wade one of the strongest boats on the lakes.

Lists of masters and engineers, as contained in this issue, may be had in bound pamphlet form for 25 cents. Marine Review, 516 Perry-Payne.

the flow is accelerated by loss of friction and more water must pass through. It improves, for the time being, the navigation facilities, but does it not at the same time lower the water levels of these great commercial highways? It is of the utmost importance that high water should be maintained on these lakes by means of dams, jetties or otherwise, but the government seems to consider only the present and not the future when it permits such works as the Chicago drainage channel and the Lime Kilns to enlarge the outflow of these lakes. The water shed of the lakes can not be enlarged, and as the forests are disappearing gradually, every means should be put forth to maintain these most important waterways as nature designed them, instead of devising means by which in time their utility will be seriously impaired.

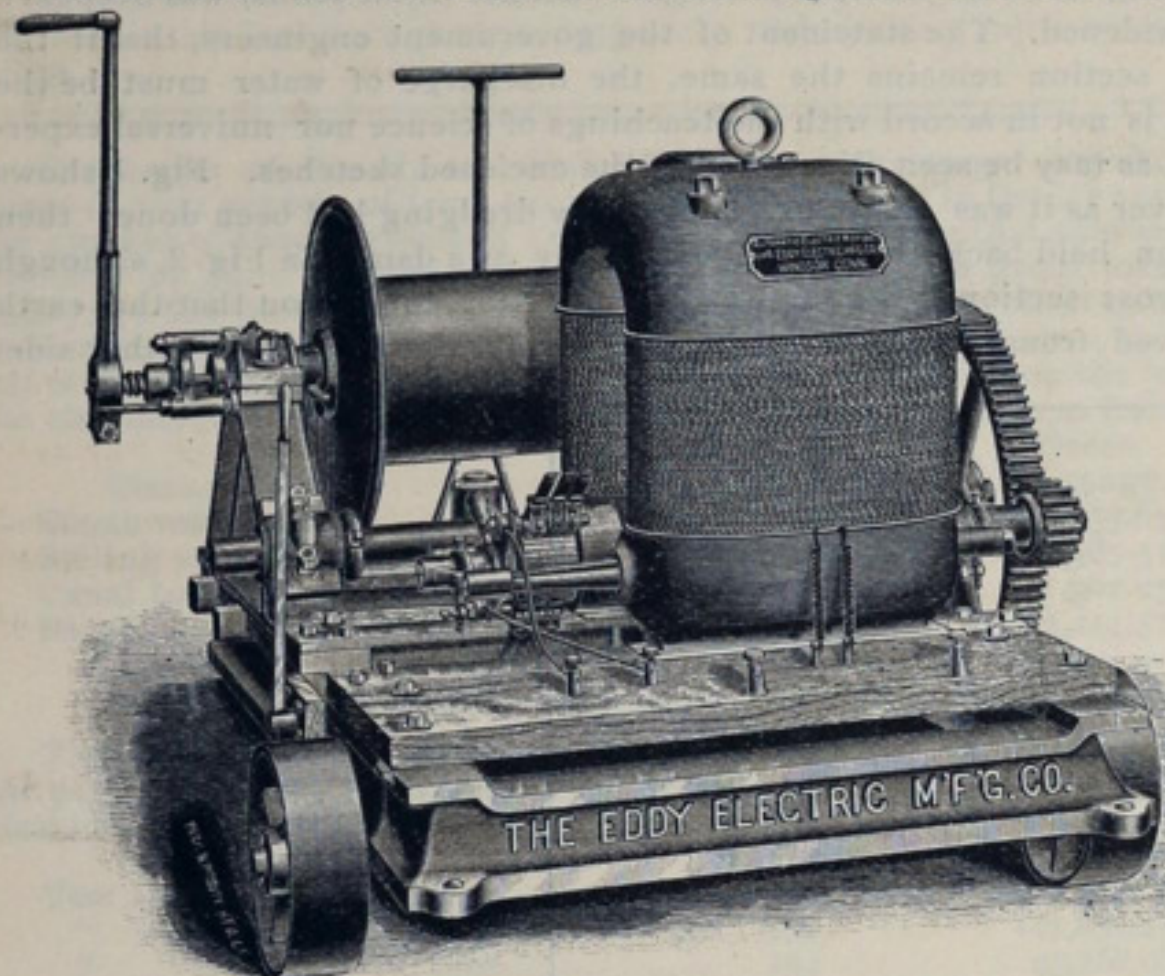
Detroit, Mich., April 15, 1895.

RICHARD P. JOY.

The Nickel Plate road can offer to the Sons of the American Revolution reduced rates to their convention at Boston, Mass., April 30th. Remember we operate through sleeping cars direct to Boston. 223 Apl30

Electric Dock and Building Hoist.

The illustration gives a very good idea of the Eddy electric dock and building hoist. This hoist consists of a drum with a hollow spindle. Within the spindle is a shaft, to which is keyed a friction clutch, adapted to engage with one end of the drum. This shaft is driven through intermediate gears by a rawhide pinion on the motor shaft. The motor is started in the usual way and runs at a constant speed, and when it is desired to lift a load, it is only necessary to bring back the lever, which by means of a screw forces the end of the drum against the friction clutch,



so causing the drum to revolve, wind up the cable and lift the load. The rate of raising or lowering the load is always under perfect control of the operator by means of the lever, which can be held in a position to allow the clutch to slip more or less. The hoist is provided with a foot-brake, so that in case the current should be shut off or it should be desired to lower the load under control of the brake, or to hold it at any point, it can easily be done. A slight pressure of the foot will hold the load in any position or lower it at any desired rate of speed, without using the driving clutch. The whole machine is under the complete control of the operator. The mechanical construction is of the best, and the standard Eddy motor is used in connection with it. This hoist is sold by the F. P. Little Electrical Construction and Supply Company, No. 135 Seneca street, Buffalo. In writing for information about hoists, it is necessary to give the maximum weight to be lifted and the number of feet that it is desired to raise it per minute, as it makes quite a difference in the construction of the hoist whether the load is to be heavy with slow speed or light with quick speed.

Trade Notes.

H. H. Baker & Co. of Buffalo has issued, for advertising purposes, a chart showing sailing distances between all ports from Montreal to Port Arthur.

J. J. Lynn of Port Huron, representing the General Electric Company, reports that Mr. M. S. Smith's steam yacht Vita of Detroit has been fitted with one of the company's 12-inch search lights.

Lake ship builders are acquainted with Fred H. Pell and also with J. H. Snelling of New York. The latter is general manager and the former general agent of the Marine Manufacturing and Supply Company, 158 South street. This company enters a field not in every sense occupied by any other concerns. They are in position to furnish outfits for all

classes of vessels—windlasses, pumps, steerers, cordage, anchor chain, etc. The company already has the agency for several well known concerns and will add a number of others shortly.

The Brown Hoisting and Conveying Machine Company, Cleveland, has recently issued another of its very interesting pamphlets, illustrating and describing the use of its conveying machines under various conditions and in many places. Numerous illustrations are presented, showing the method of handling ore and other material at the Cleveland docks, and the application of the machines is also shown as used on the Chicago drainage canal; in constructing sewers and trenches, and in laying out yard of the Johnson Company, in Johnstown, Pa.; at the Newport News Shipbuilding and Dry Dock Company's shipyard, Newport News, Va., and at many other points. A description and illustrations are given of the Fayette Brown patent furnace hoist as used at the Riverside Iron Works at Steubenville, O.

The Continental Iron Works, Brooklyn, N. Y., known throughout the country as manufacturers of corrugated furnaces, have just issued a book descriptive of the Morrison suspension furnace, which inherits all the valuable features of the Fox corrugated furnace, but in a pronounced and perfect development. The Continental company has the sole right for the manufacture of this furnace, as well as the corrugated furnace, throughout the United States and Canada. Either type of furnace, of equal dimensions and requirements, may be purchased at the same price. This latest invention has met with the appreciation of, and has been properly classified, by the English admiralty, Lloyds, Bureau Veritas and the board of United States supervising inspectors of steam vessels, and the book descriptive of it contains a list of several hundred naval and merchant steamers to which it has been fitted. The book would make a valuable addition to the library of any of the engineers connected with ship or engine building plants, and the managers of the Continental works will undoubtedly be pleased to forward a copy of it upon application.

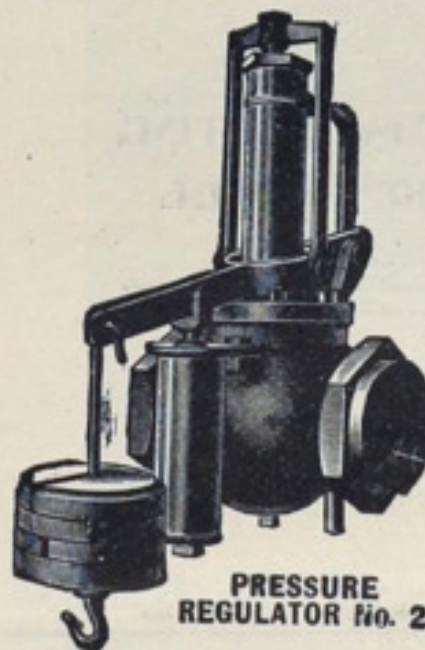
U. S. ENGINEER OFFICE, TELEPHONE Building, Detroit, Mich., April 12, 1895. Sealed proposals for dredging Cheboygan harbor, Saginaw river above Bay City, and bar at mouth of Saginaw river, Mich., will be received here until 12 M., May 2, 1895, and then publicly opened. Apply here for information and specifications. G. J. LYDECKER, Lt. Col., Engrs. Apl 26



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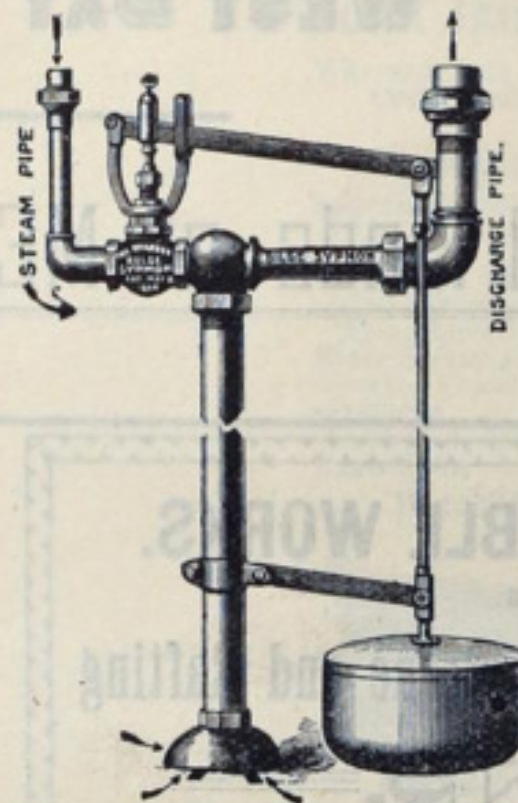
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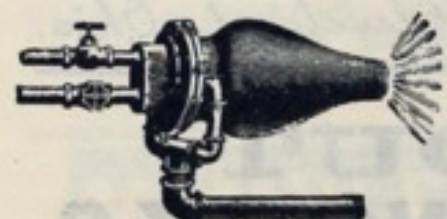
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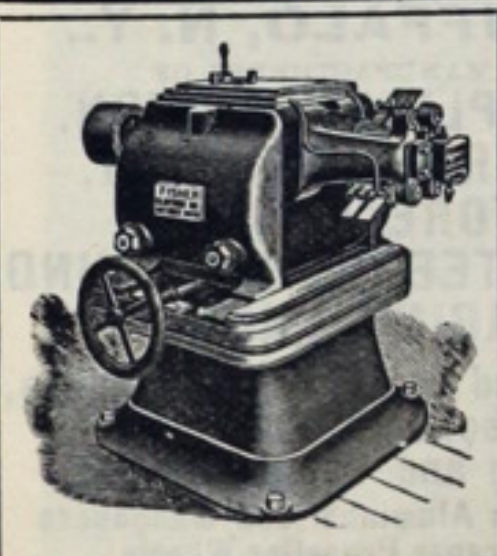
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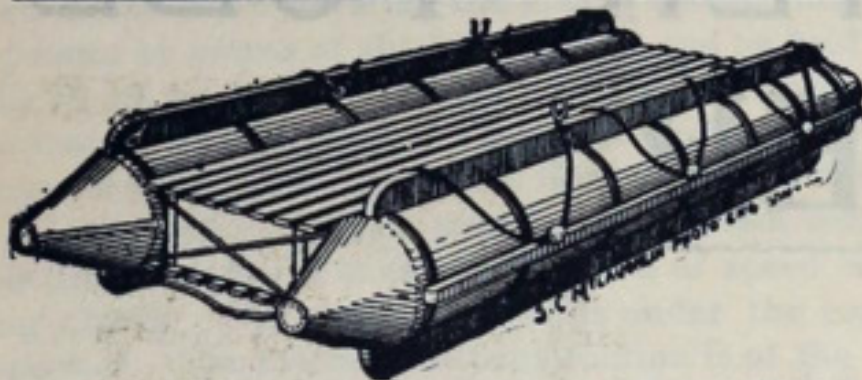
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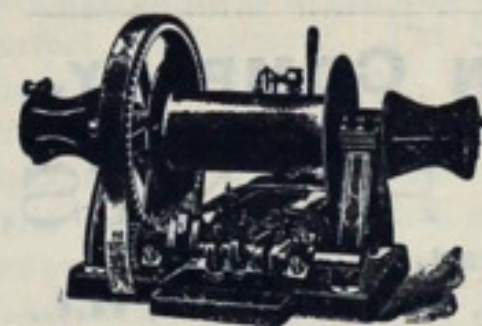
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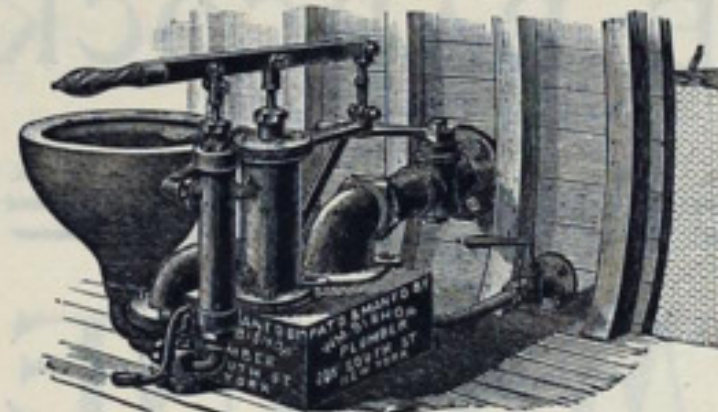
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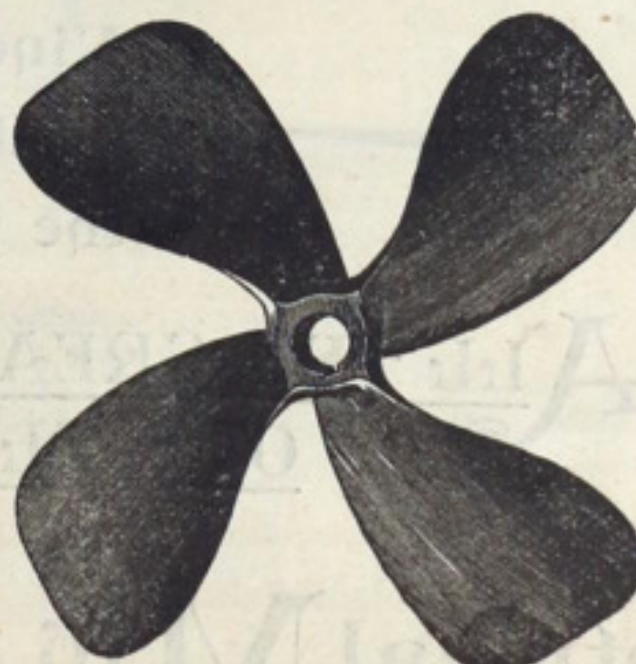
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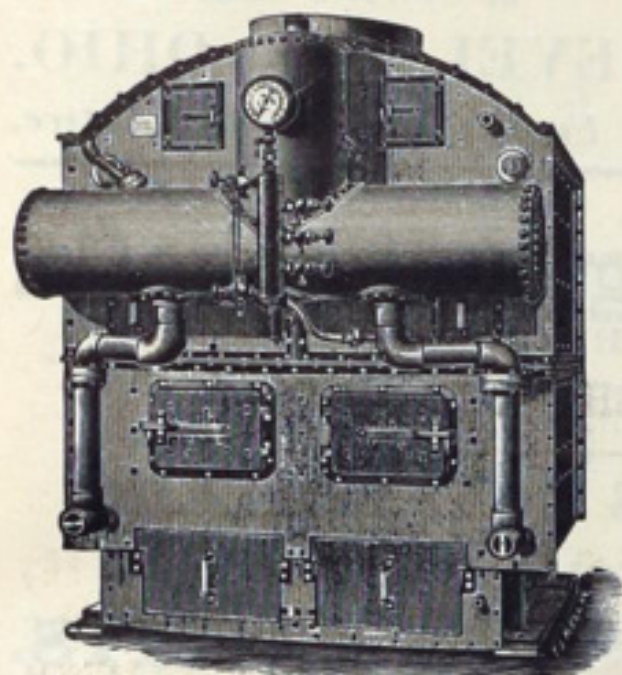
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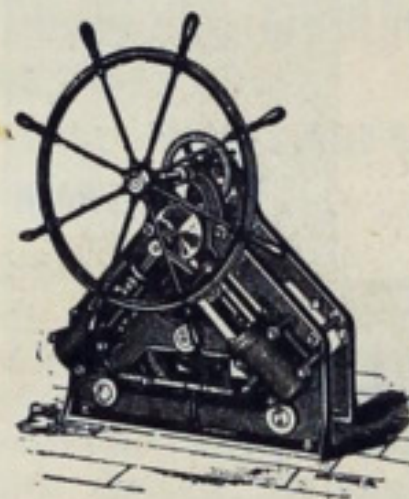
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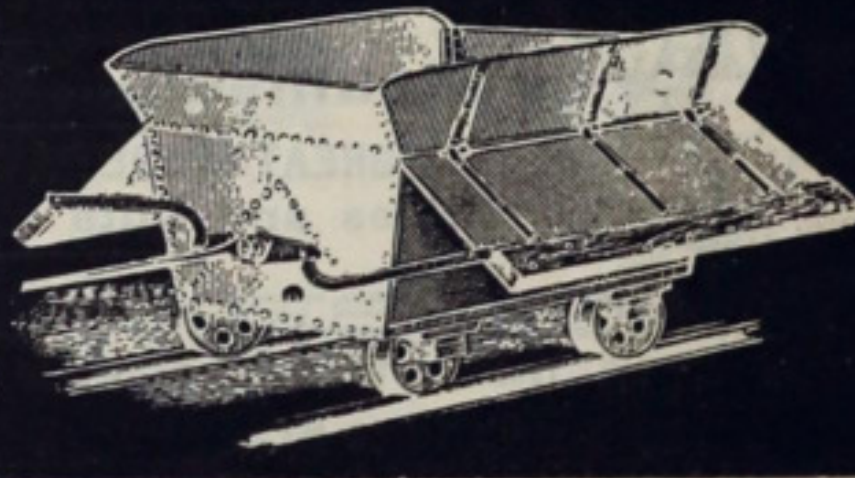
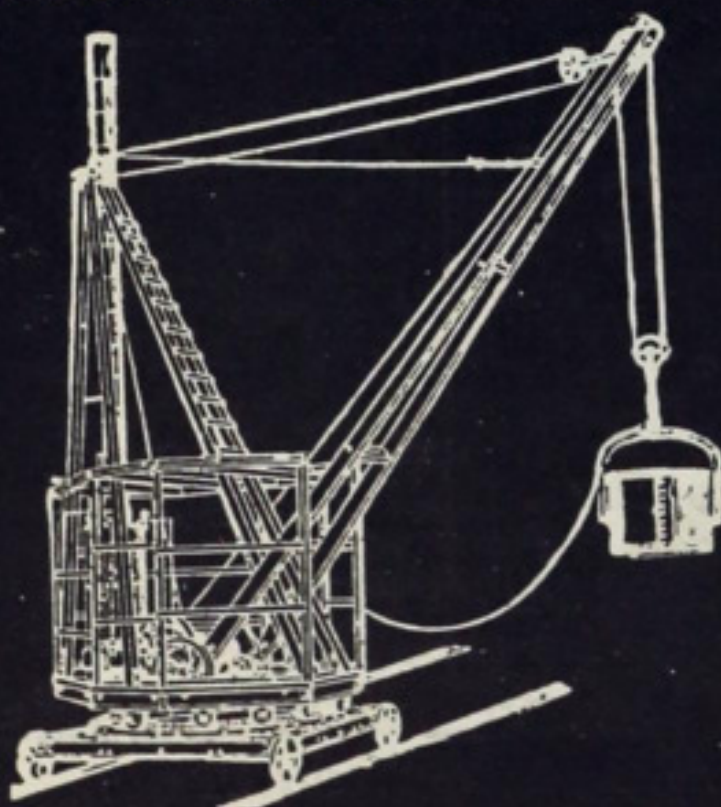
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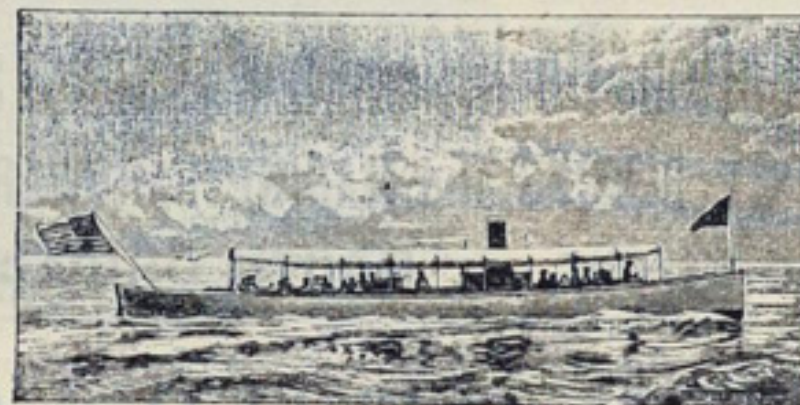
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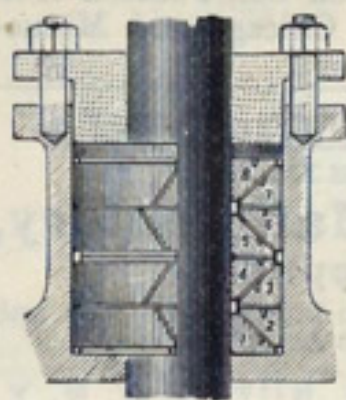
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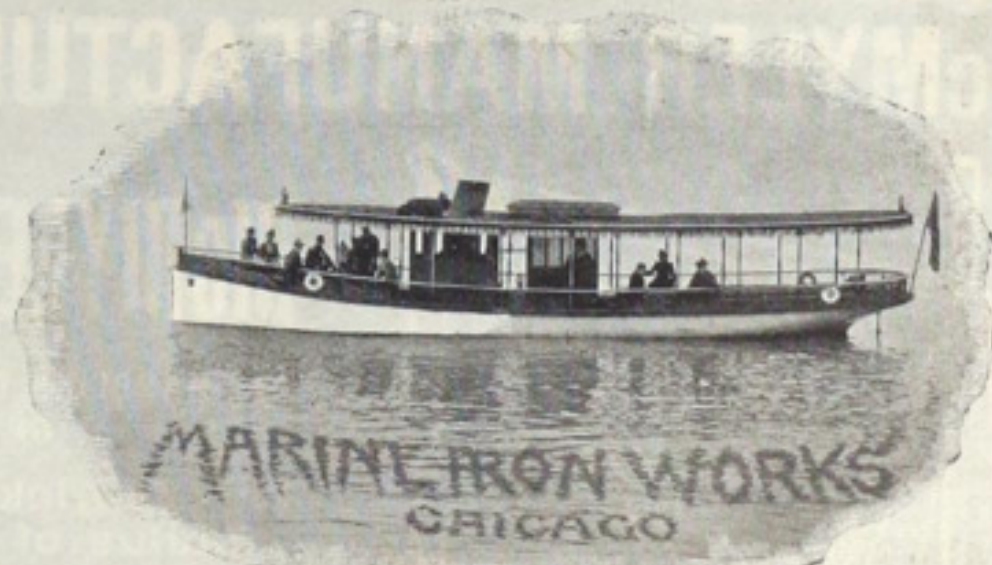
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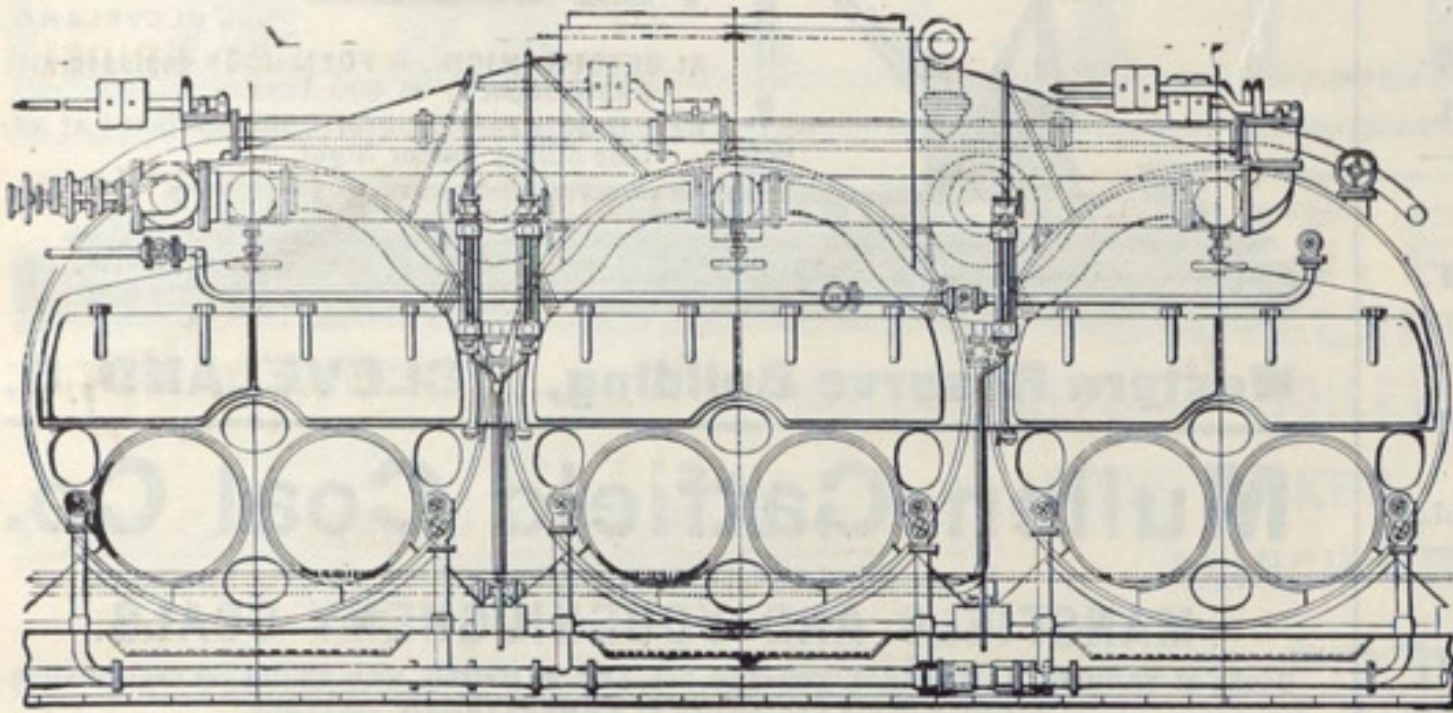
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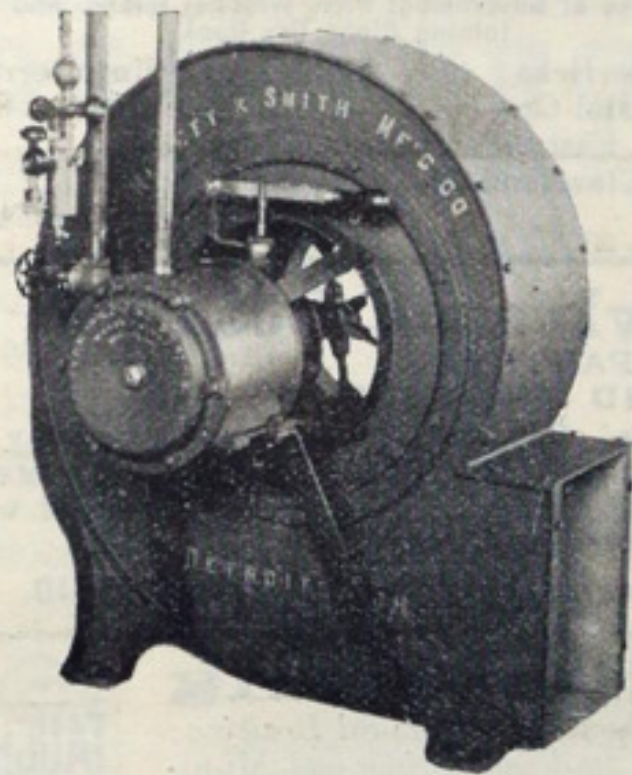
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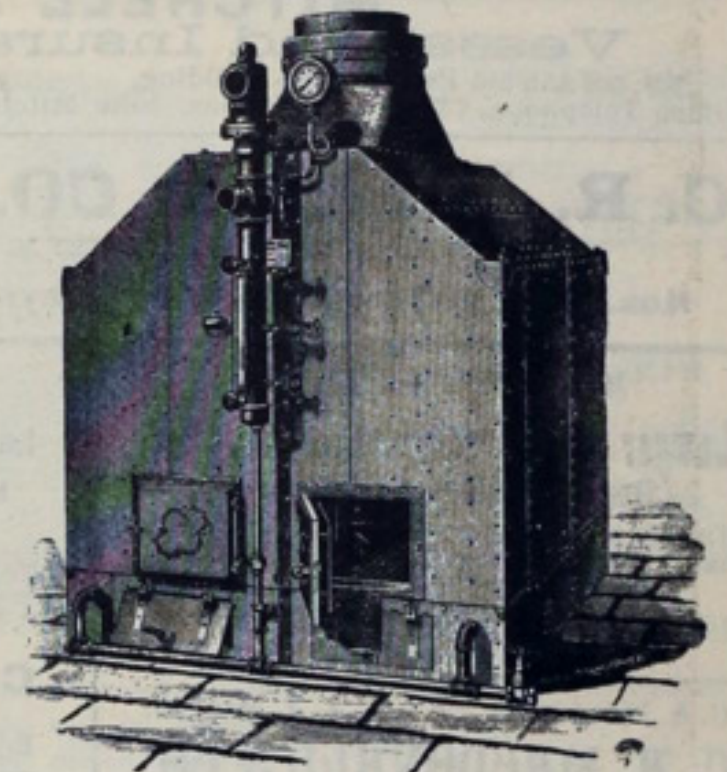
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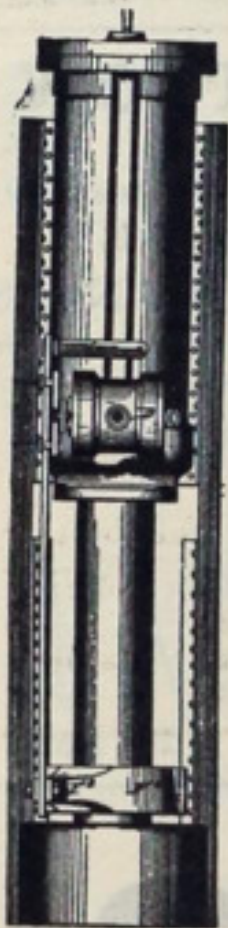
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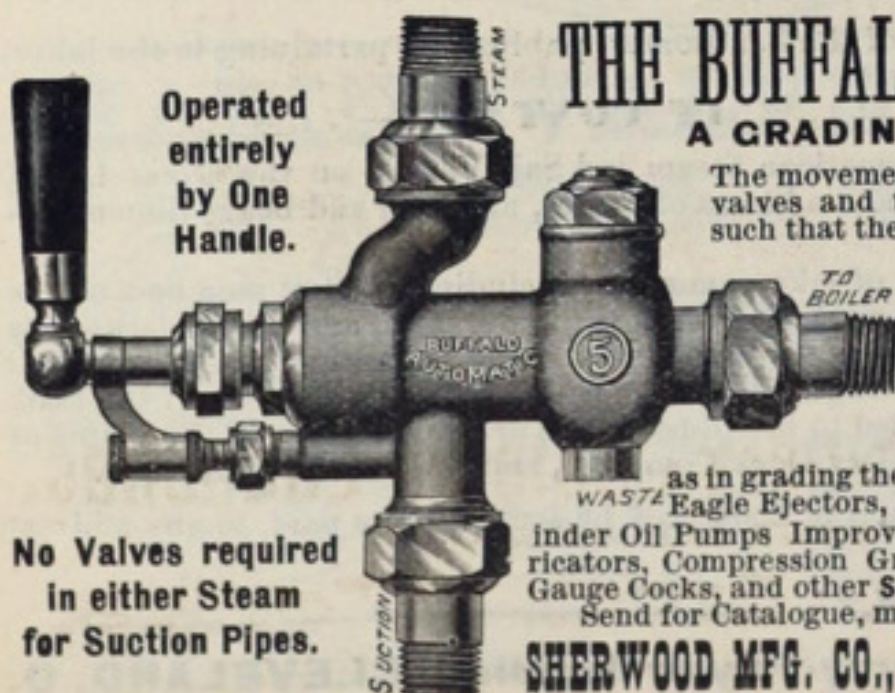
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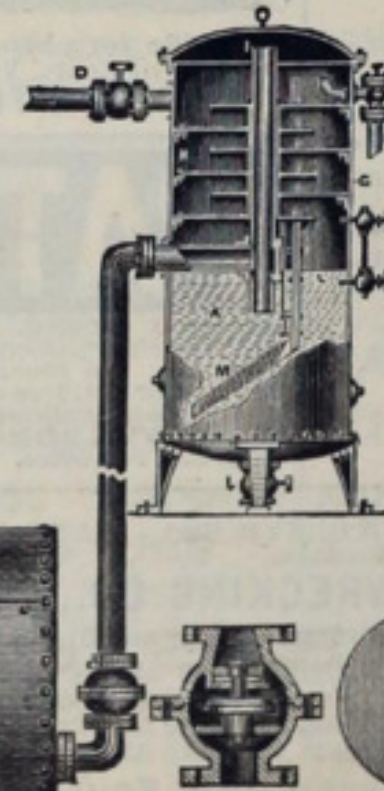
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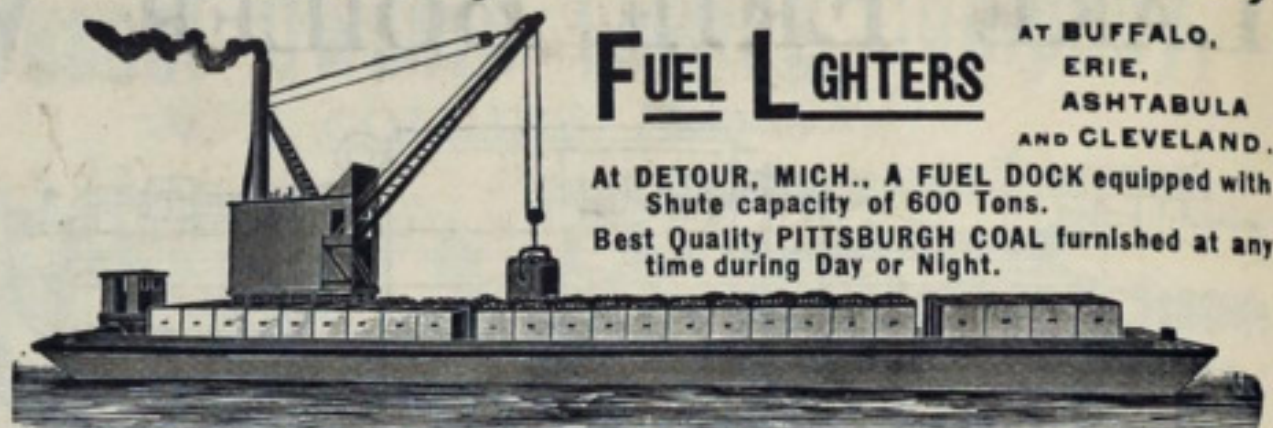


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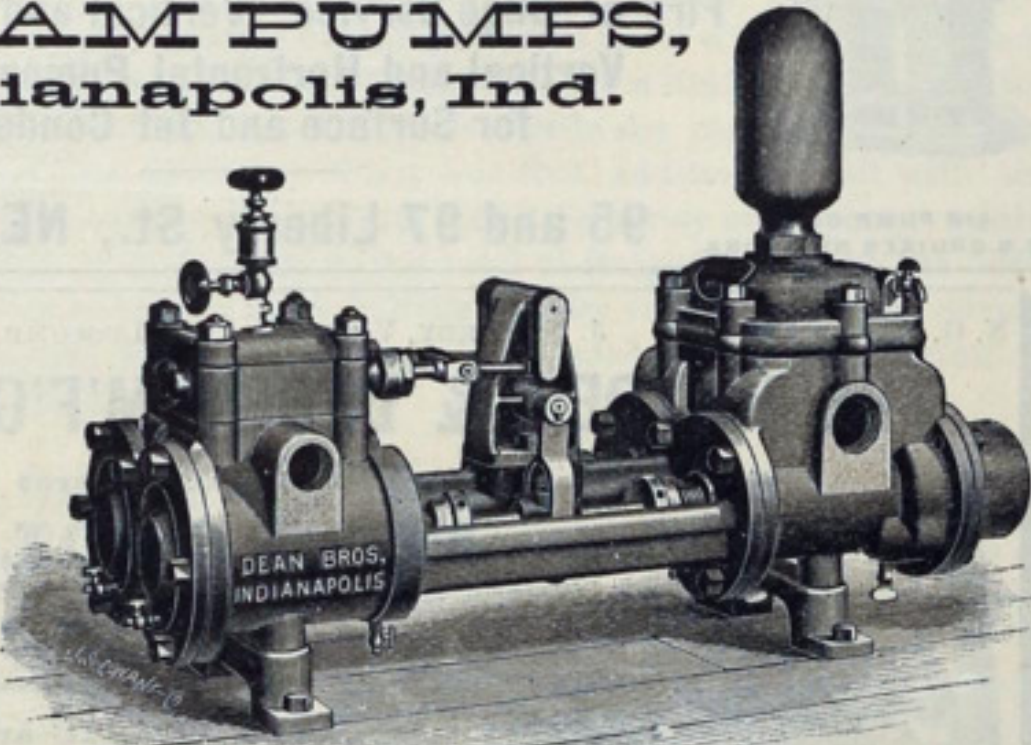
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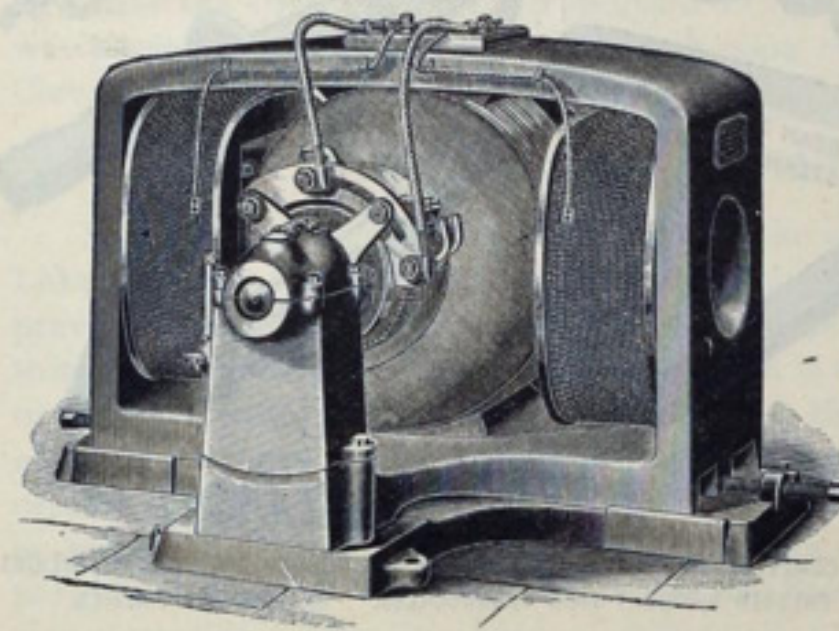
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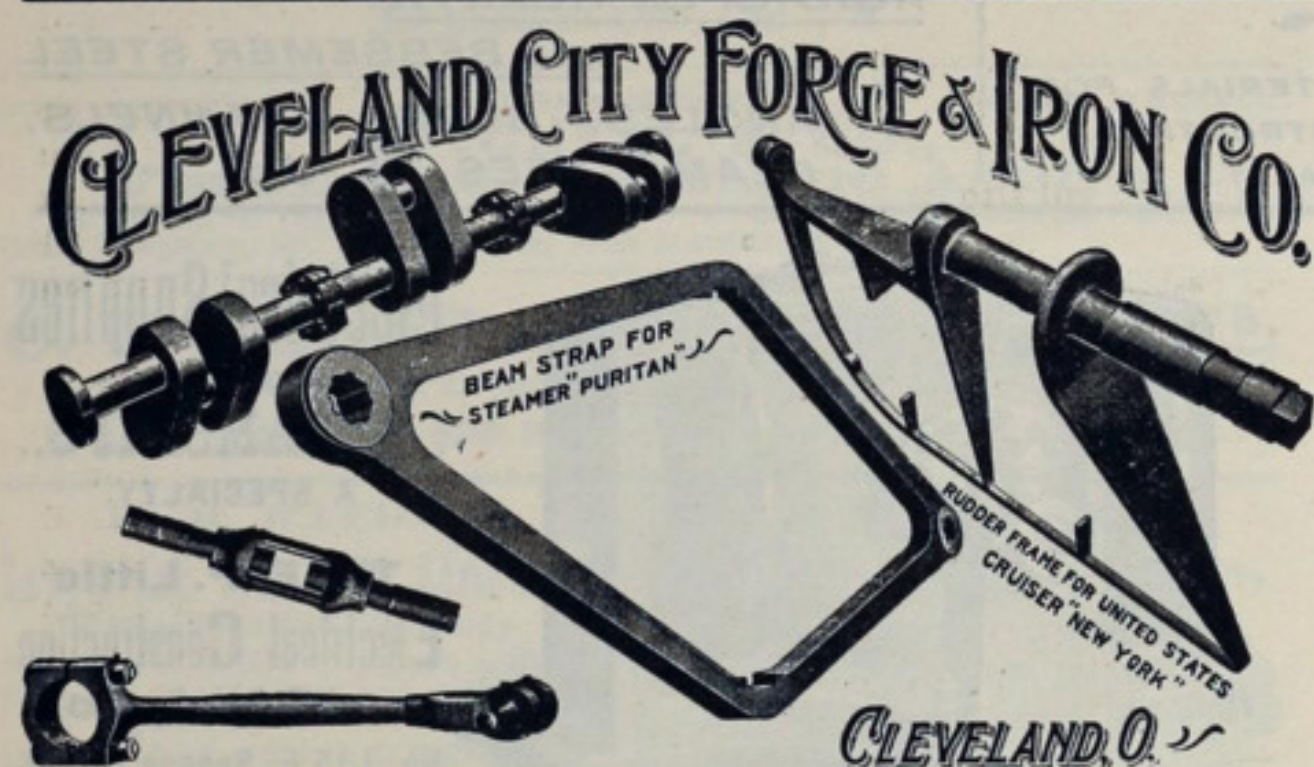
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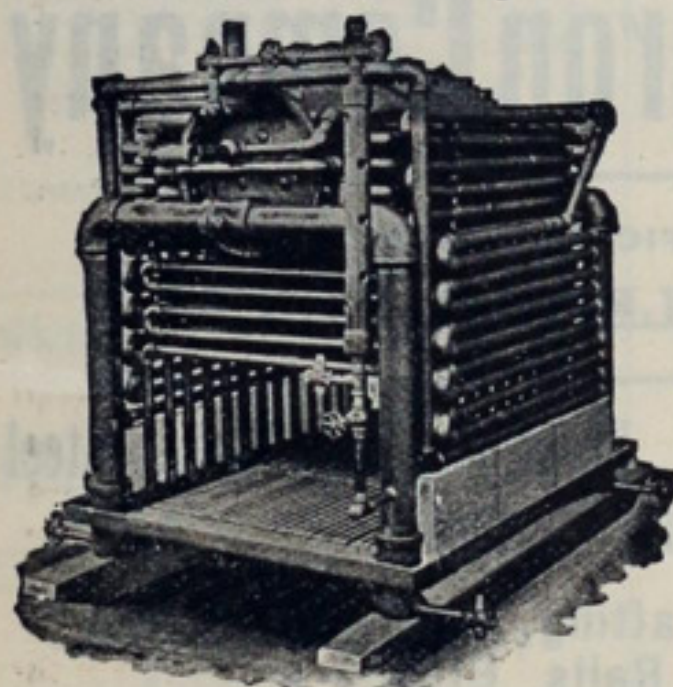
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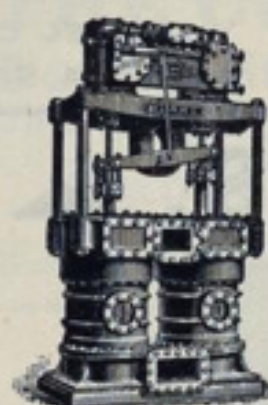
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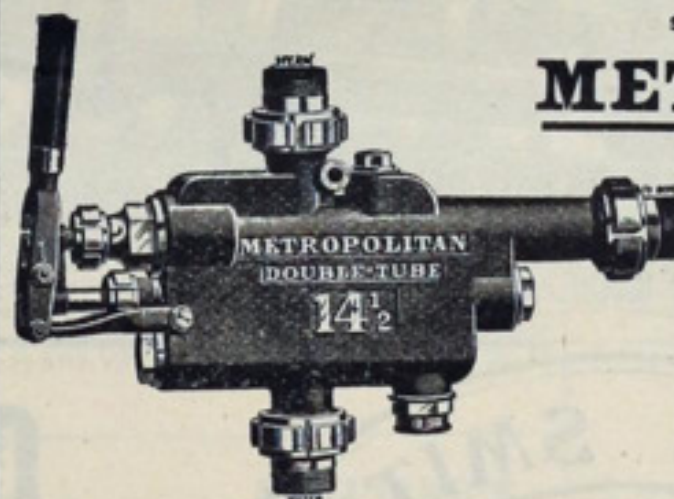
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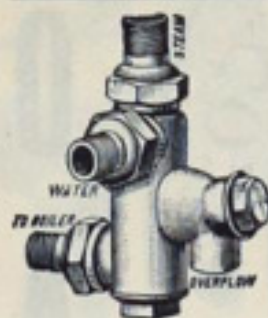
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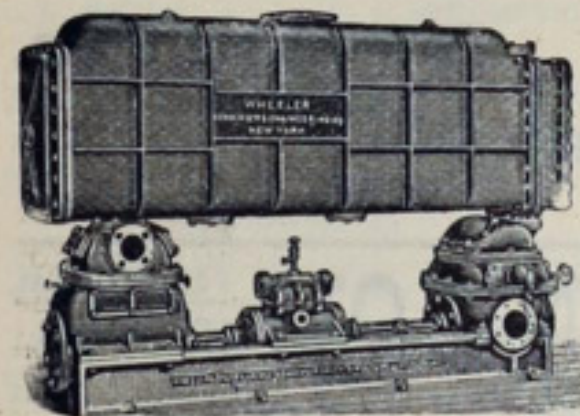
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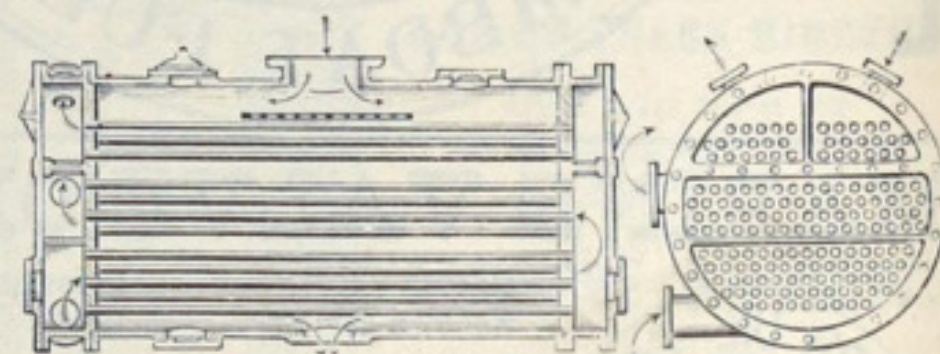
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